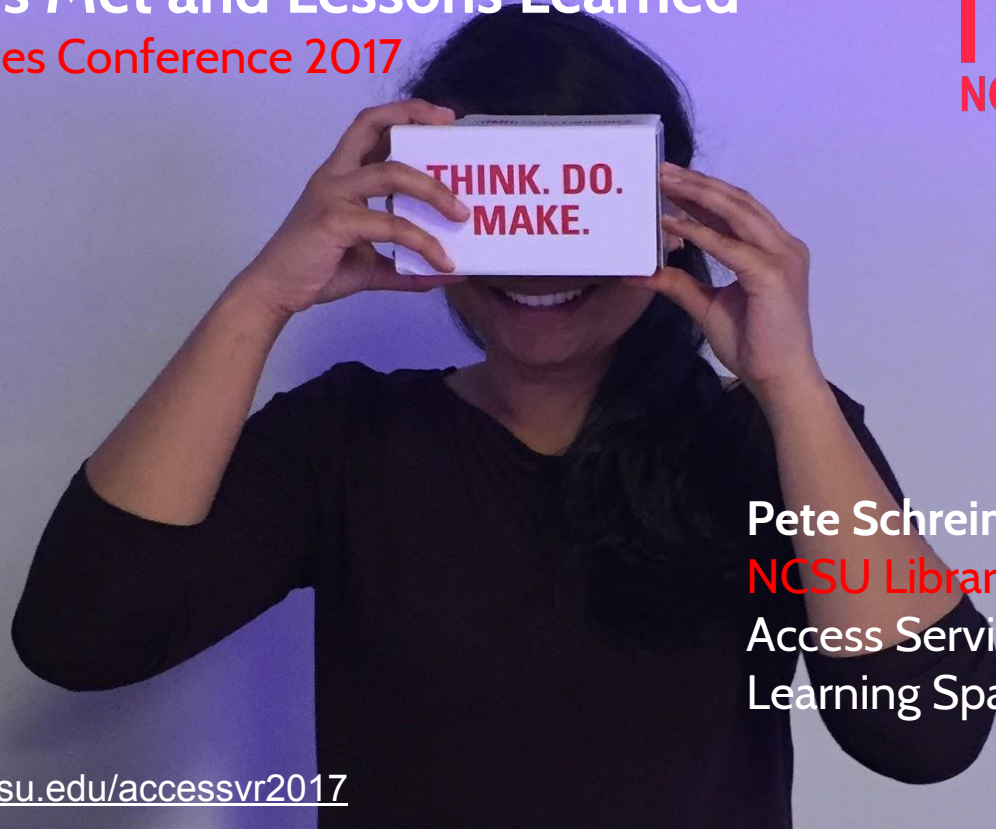


# Accessing Virtual Reality: Challenges Met and Lessons Learned

Access Services Conference 2017



Pete Schreiner  
NCSU Libraries Fellow  
Access Services and  
Learning Spaces & Services

Slides at [go.ncsu.edu/accessvr2017](http://go.ncsu.edu/accessvr2017)



**Pete Schreiner**  
**NCSU Libraries Fellow**  
Access Services and  
Learning Spaces & Services  
[prschrei@ncsu.edu](mailto:prschrei@ncsu.edu)





**Our Vision: The Libraries: NC State's competitive advantage. We make NC State better.**

The NCSU Libraries is the gateway to knowledge for North Carolina State University and its partners. We define the leading edge of research collections, innovative learning spaces, and user-centered services to support the university's mission and to further knowledge in the world.

- **Public, land-grant institution founded in 1887**
- **More than 34,000 students from 119 countries, including over 9,900 graduate students**
- **More than 2.3 million total Libraries user visits per year.**

# Virtual Reality

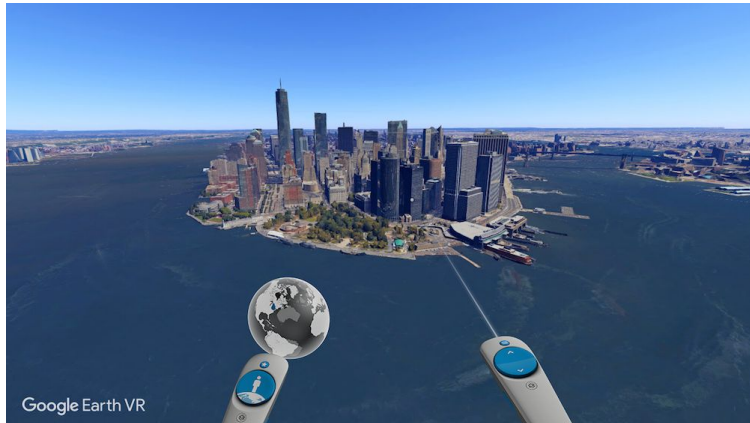


**“VR is an immersive media that replicates an environment that simulates a place in a real or imagined world, in which one's actions partially determine what happens in that environment.”**

*- Merriam Webster Dictionary*



# Virtual Reality

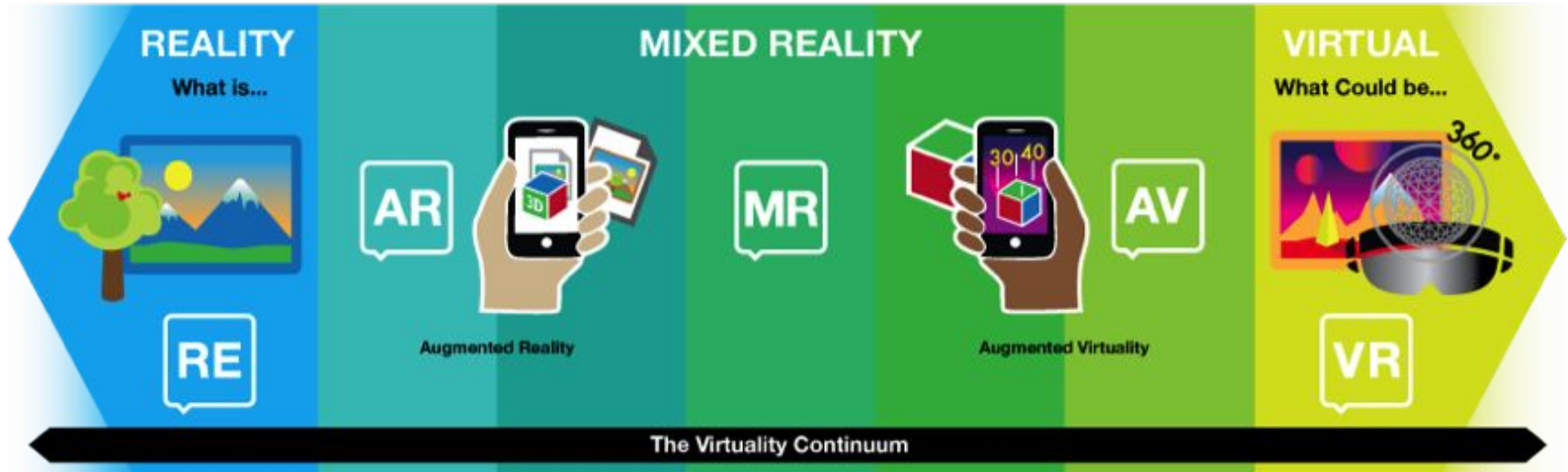


# Augmented Reality



**“AR is an enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device (such as a smartphone camera).”**

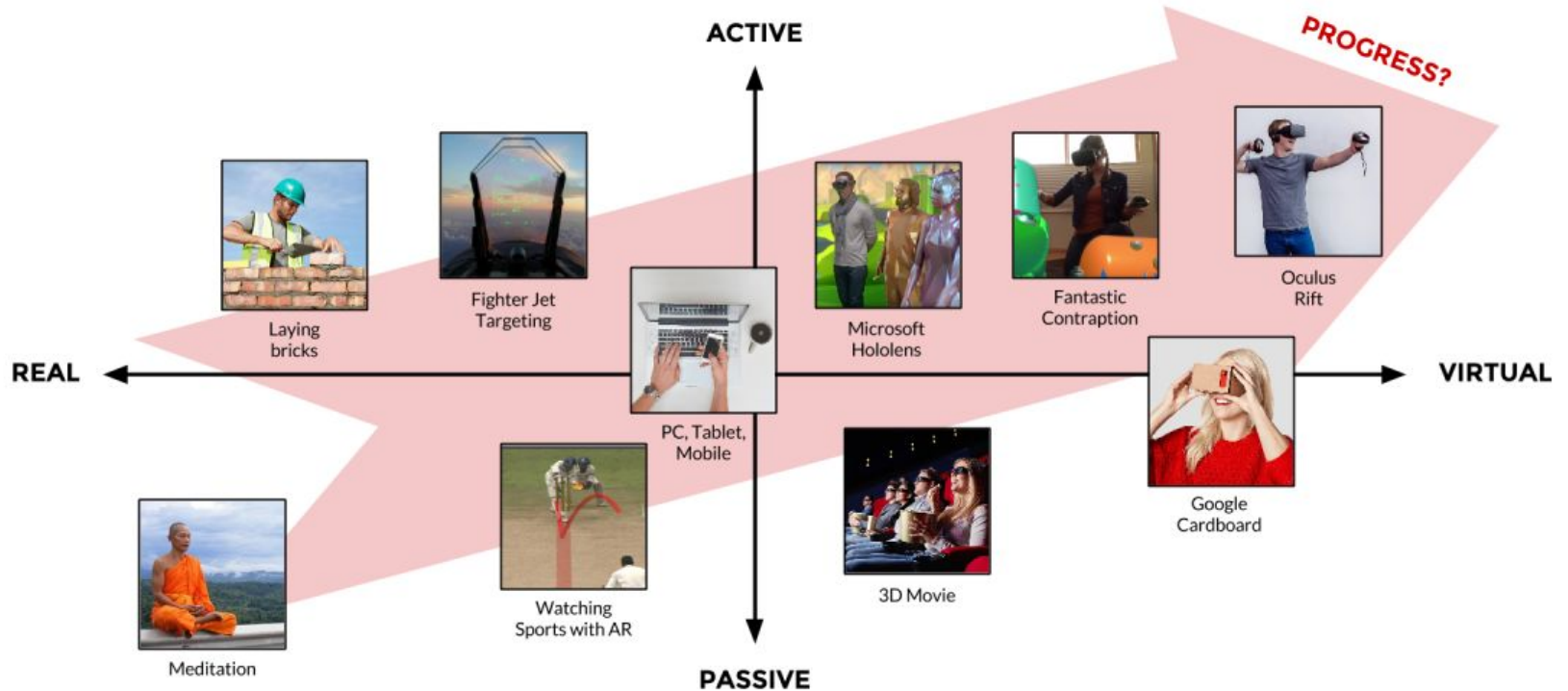
*- Merriam Webster Dictionary*



Source: <http://smartideasblog.trekk.com/augmented-or-virtual-how-do-you-like-your-reality>

# WHAT IS REAL?

mixed reality continuum and levels of involvement





# The Potential of Virtual Reality

## Clinical Psychology

Emory researchers report first findings of virtual reality exposure therapy for veterans with PTSD

Woodruff Health Sciences Center | April 21, 2014



The virtual reality exposure therapy involved 30-45 minutes of exposure to virtual environments on a head-mounted video display that attempt to match stimuli described by the veteran.

[http://news.emory.edu/stories/2014/04/virtual\\_reality\\_exposure\\_reduces\\_PTSD/campus.html](http://news.emory.edu/stories/2014/04/virtual_reality_exposure_reduces_PTSD/campus.html)  
<http://www.rollingstone.com/culture/features/can-virtual-reality-help-cure-ptsd-w477388>

## Consumer Behavior

### ShelfZone



ShelfZone is an advanced and photorealistic retail space simulator of large-scale retail environments such as supermarkets and malls.

<http://www.invrision.com/>

## Pain Therapy / Healthcare

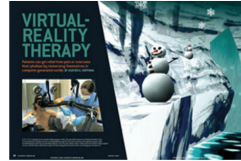


Photo on right shows a patient using U.W. HITLab/Harborview's SnowWorld pain distraction at Shriners Children's Burn Center Galveston. UW designer/researcher Hunter Hoffman's latest version of SnowWorld was created for the UW by gifted worldbuilders at [www.firsthand.com](http://www.firsthand.com): using [www.3ds.com](http://www.3ds.com) Virtual World Development Software.

<https://www.hitl.washington.edu/projects/vrpain/>

## Storytelling / Journalism



<http://www.nytimes.com/marketing/nytvr/>

nytvr

## Simulation



## Data Interaction



Researchers investigate details of an astronomical simulation in the CAVE at the Los Alamos SuperComputing Center. CAVE stands for Cave Automatic Virtual Environment or Immersive virtual reality environment.

<http://www.lanl.gov/>

# Programming: NCSU Libraries as VR/AR Incubator

- Make technology available
- Engage community
- Provide expertise
- Host exploration and creation space





# Technology: VR



Oculus Rift



HTC Vive



Playstation VR



Fove

# VR Controllers



Vive



Rift



Playstation VR

# Oculus Rift

Rift Kit ~ \$400

Computer ~\$1000+



# Rift Tracking



The Rift sensor is a camera that detects infrared beacons on the Rift headset.



# Recommended Computer Specs

From Oculus website: <https://support.oculus.com/1633938460220125/>

Graphics card: NVIDIA GTX 1060 / AMD Radeon RX 480 or greater

CPU: Intel i5-4590 equivalent or greater

Memory: 8GB+ RAM

Video Output: Compatible HDMI 1.3 video output

USB Ports: 3x USB 3.0 ports, plus 1x USB 2.0 port

Operating System: Windows 7 SP1 64 bit or newer

Alienware VR-ready desktop computer: \$799 - \$5,999



# HTC Vive

Vive Kit ~\$600

Computer ~\$1000+

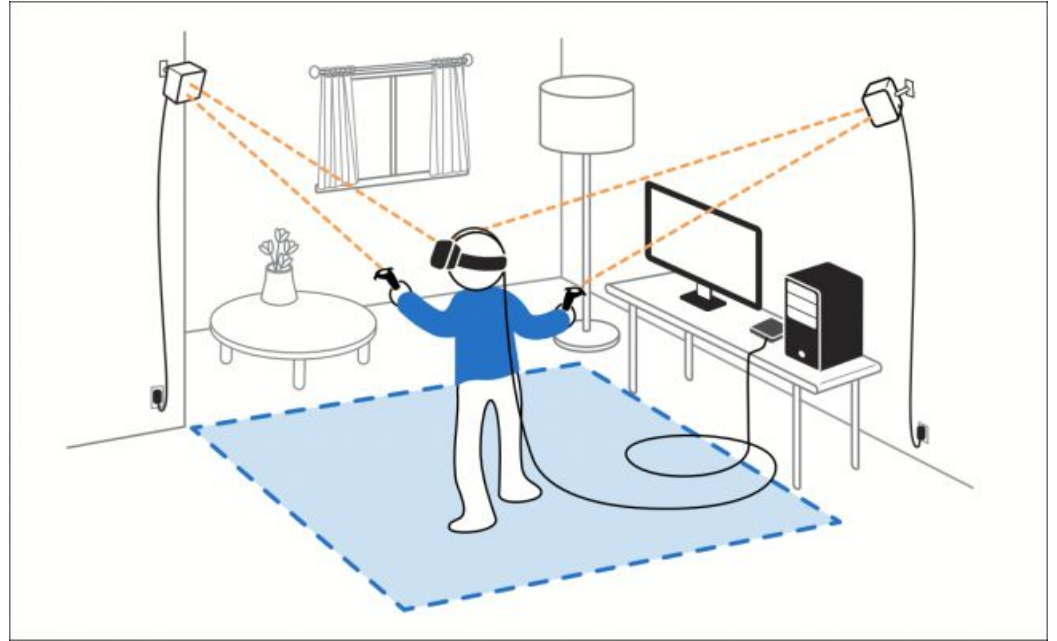




# Vive Tracking



The Vive Base Stations emit infrared pulses and X/Y axis sweeps, which are detected by sensors on the headset and controllers.



# Recommended Computer Specs

From Vive website: <https://www.vive.com/us/ready/>

Graphics card: NVIDIA GeForce™ GTX 1060 or AMD Radeon™ RX 480, equivalent or better.

CPU: Intel™ Core™ i5-4590 or AMD FX™ 8350, equivalent or better

Memory: 4 GB+ RAM

Video Output: 1x HDMI 1.4 port, or DisplayPort 1.2 or newer

USB Ports: 1x USB 2.0 port or newer

Operating System: Windows™ 7 SP1, Windows™ 8.1 or later or Windows™ 10

Alienware VR-ready desktop computer: \$799 - \$5,999



# Playstation VR

PSVR Kit ~\$600

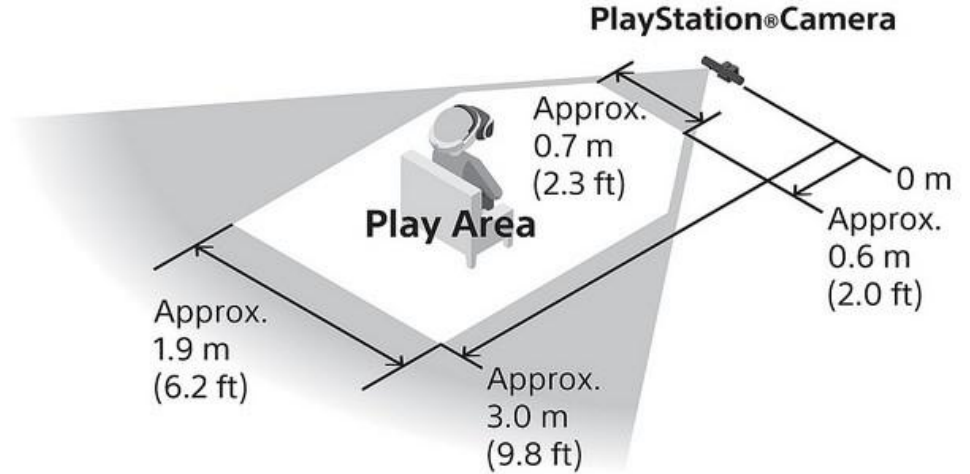
No computer required



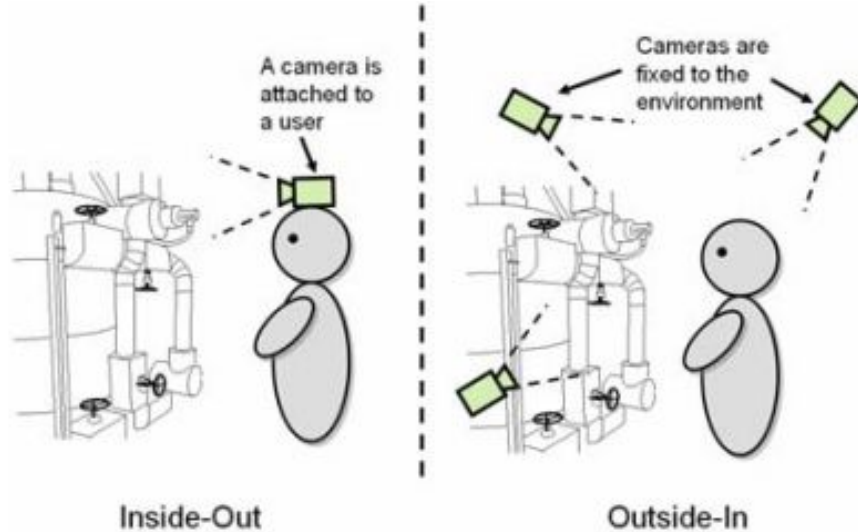
# Playstation VR



Camera sensor tracks lights on headset and controllers.



# Inside Out Tracking



Ishii, 2017 [https://xinreality.com/wiki/Inside-out\\_tracking](https://xinreality.com/wiki/Inside-out_tracking)



Acer Windows Mixed Reality ~\$399  
<https://newatlas.com/microsoft-unveils-affordable-virtual-reality-controllers-inside-out-tracking/49487/>

# Technology: Mobile Device VR & AR



Google Cardboard



Samsung Gear VR

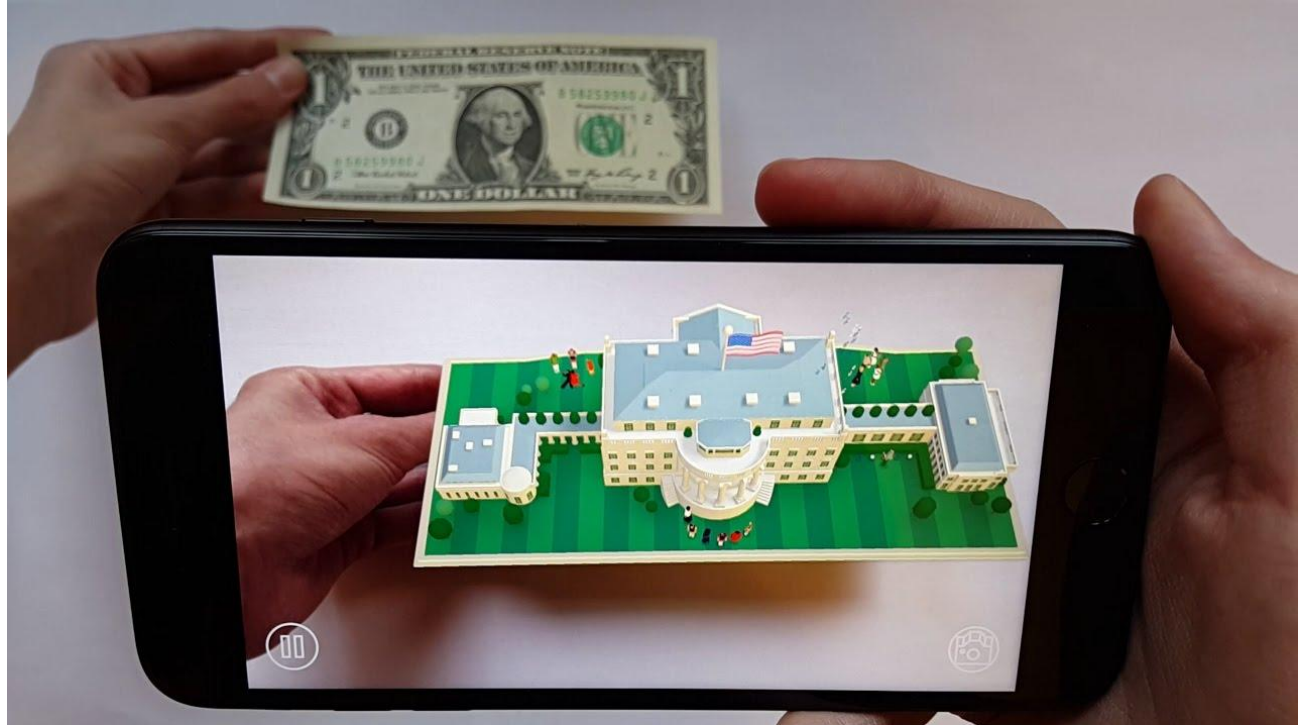


Google Daydream



# Technology: Mobile Device AR

1600 App



# Technology: Mobile Device AR



Merge Cube



[www.mergevr.com](http://www.mergevr.com)

# Technology: Head Mounted AR



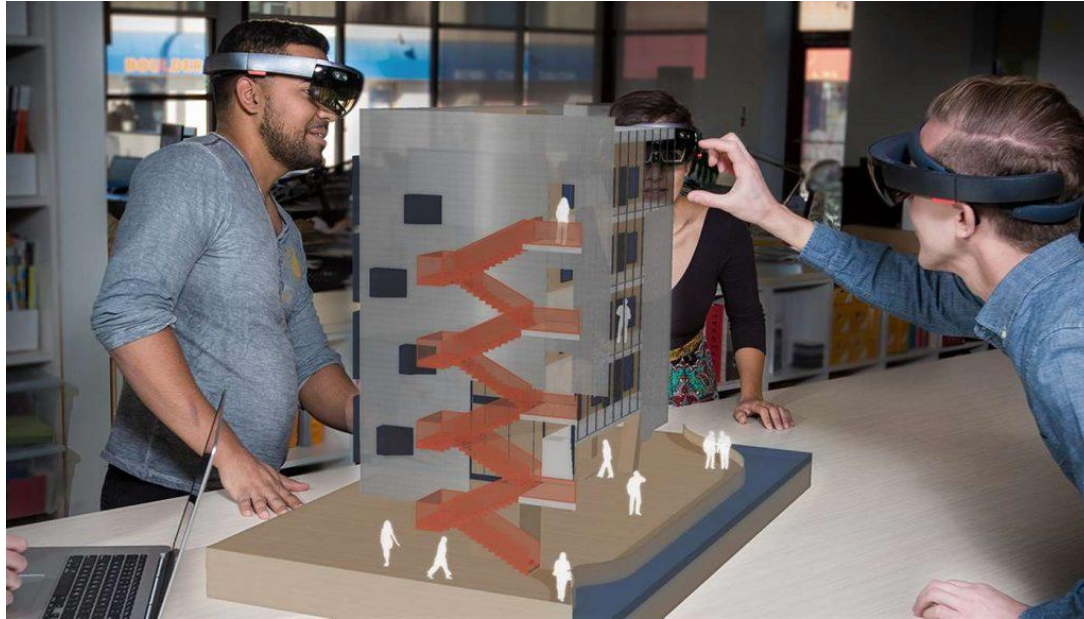
Microsoft HoloLens



Meta

# Technology: Head Mounted AR

HoloLens with SketchUp Viewer app



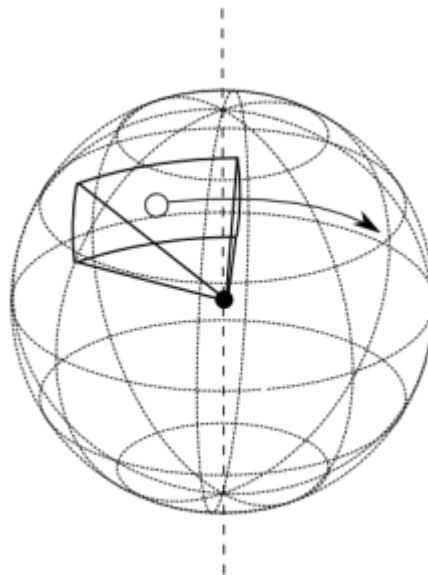
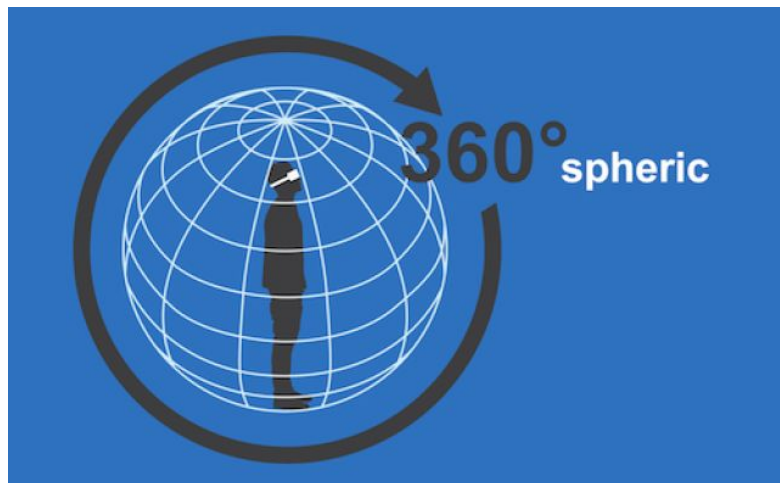
<https://www.geospatialworld.net/blogs/sketchup-viewer-for-microsoft-hololens-is-here/>



# 360° Photo and Video



# 360° Formats





# Technology: 360 Photo & Video



Ricoh Theta



Nikon KeyMission

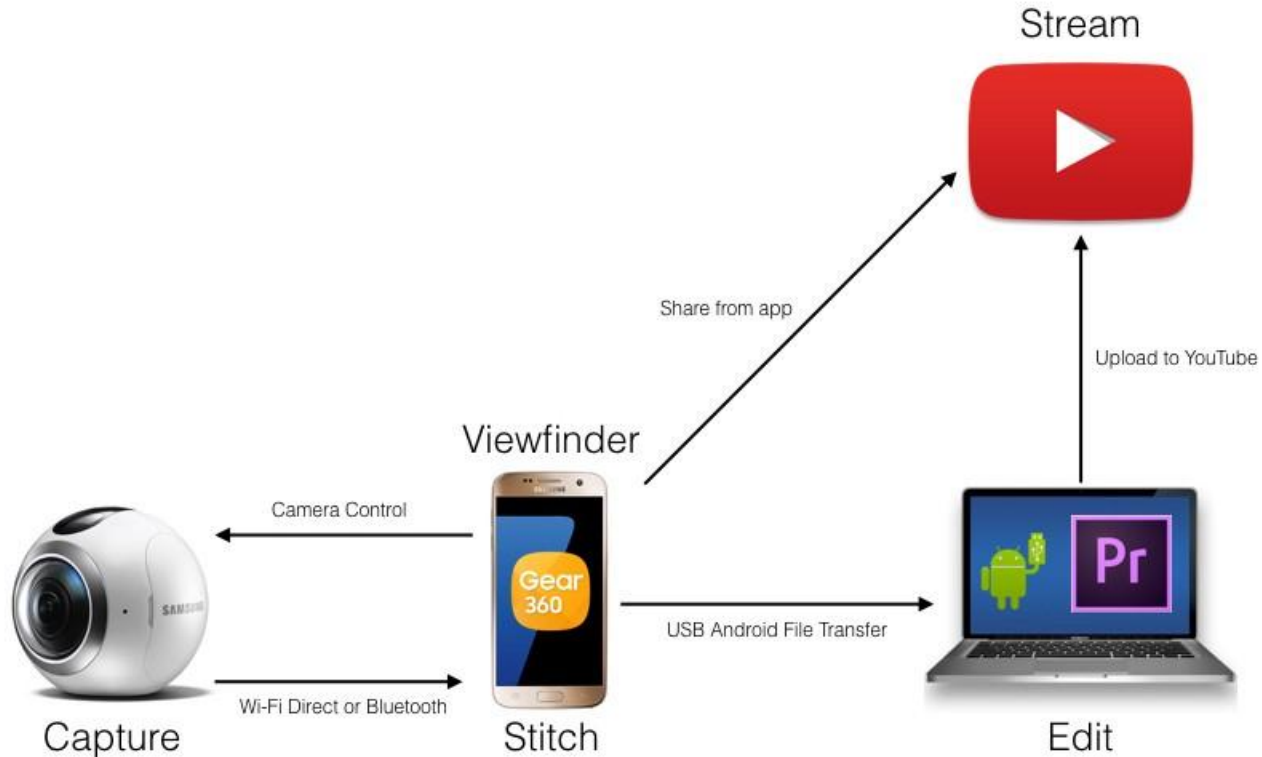


Samsung Gear 360



GoPro 6-Cam Array

# 360 Workflow



# 360° Formats



Unstitched



Equirectangular (2:1)

# Technology Lending

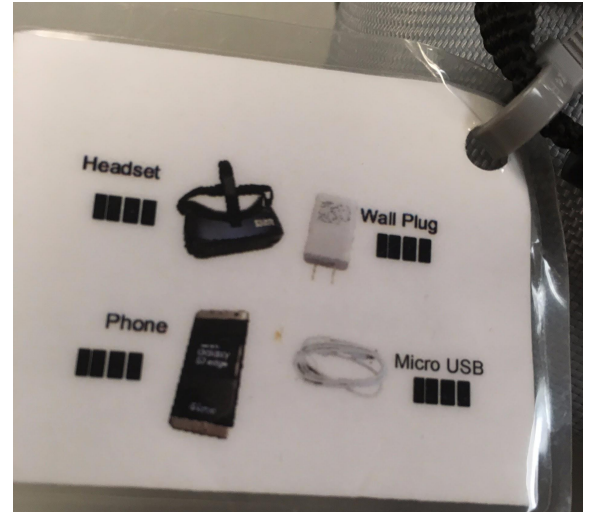
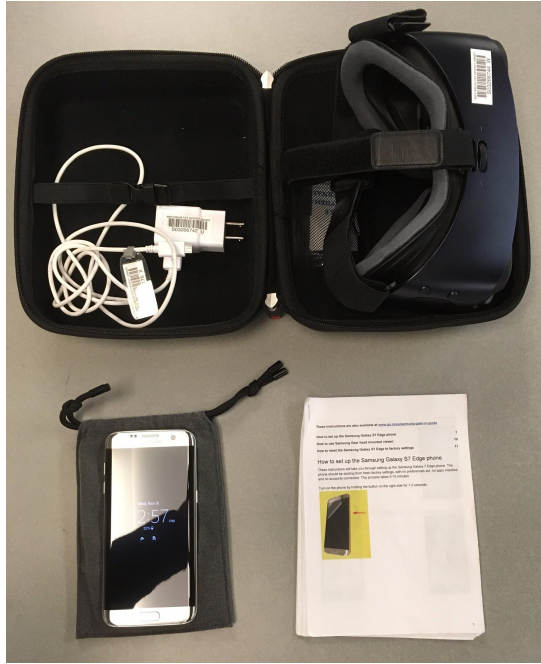


# Tech Lending: Rift





# Tech Lending: Samsung Gear VR



# Tech Lending: Support

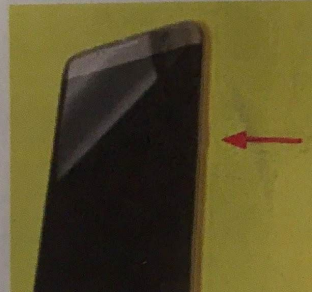
These instructions are also available at [www.go.ncsu/samsung-gear-vr-guide](http://www.go.ncsu/samsung-gear-vr-guide)

How to set up the Samsung Galaxy S7 Edge phone	1
How to use Samsung Gear head mounted viewer:	10
How to reset the Samsung Galaxy S7 Edge to factory settings	11

## How to set up the Samsung Galaxy S7 Edge phone

These instructions will take you through setting up the Samsung Galaxy 7 Edge phone. The phone should be starting from fresh factory settings, with no preferences set, no apps installed, and no accounts connected. This process takes 5-15 minutes.

Turn on the phone by holding the button on the right side for 1-2 seconds.

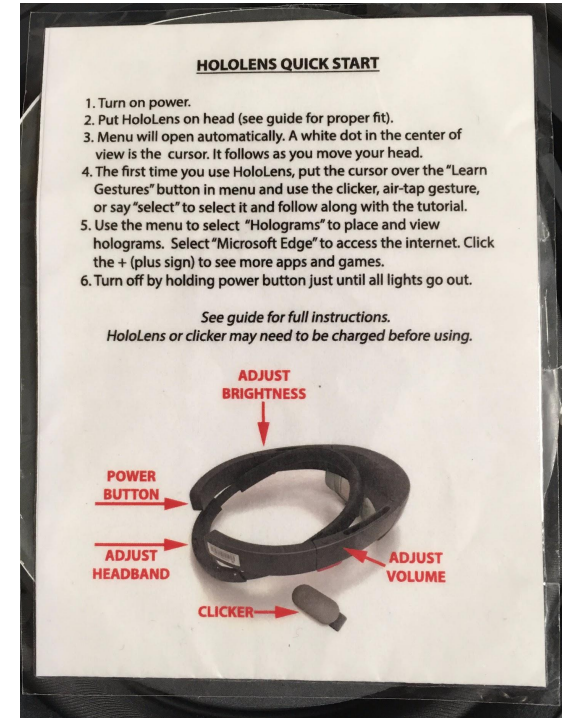




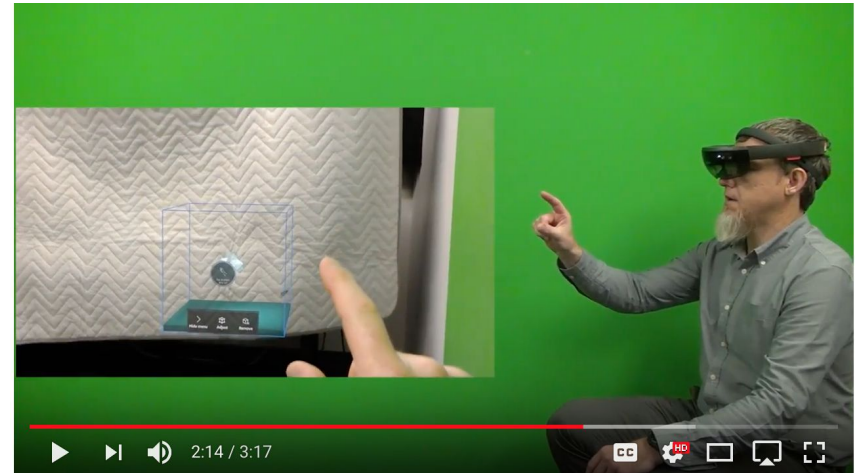
# Tech Lending: HoloLens



# Tech Lending: HoloLens

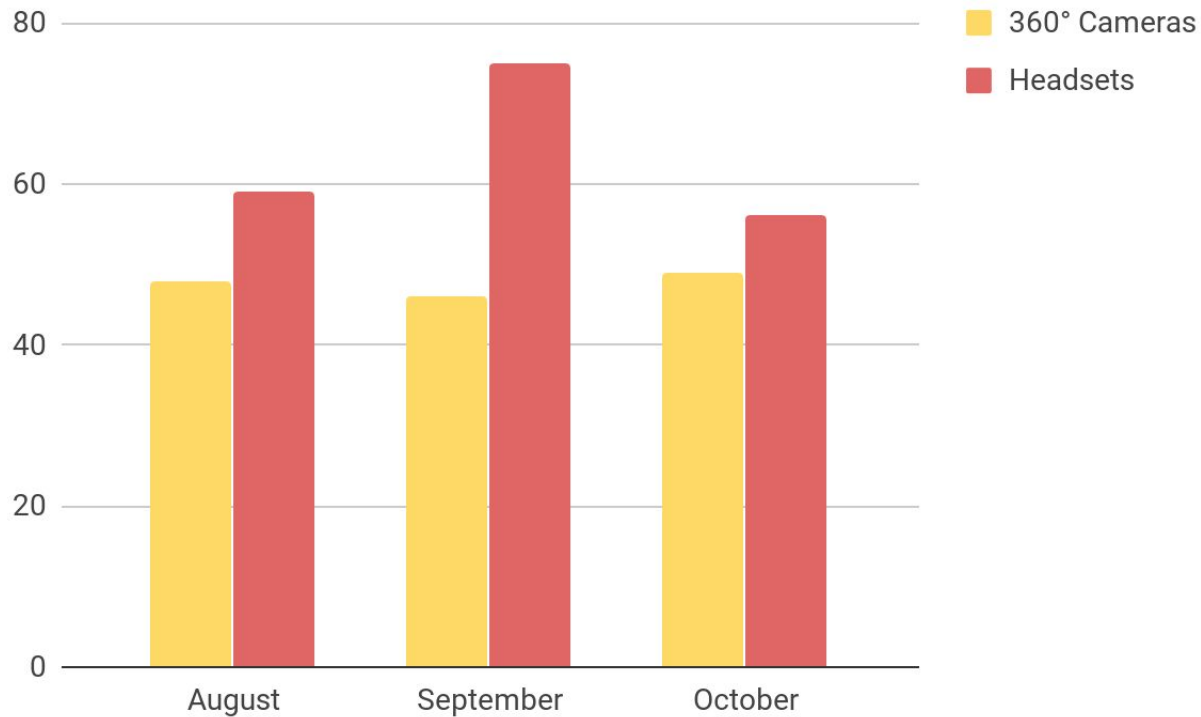


# Tech Lending Support: HoloLens



<https://youtu.be/pJqNxvPCXq8>

# VR Tech Lending: Fall 2017



# VR/AR Labs: Goals

Research & experimentation for campus community

Support collaboration

Development workstations

Testing apps

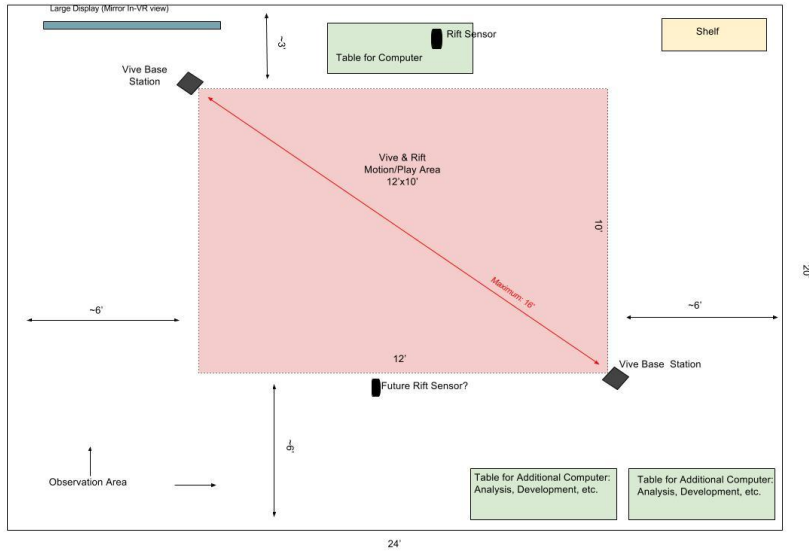
User research



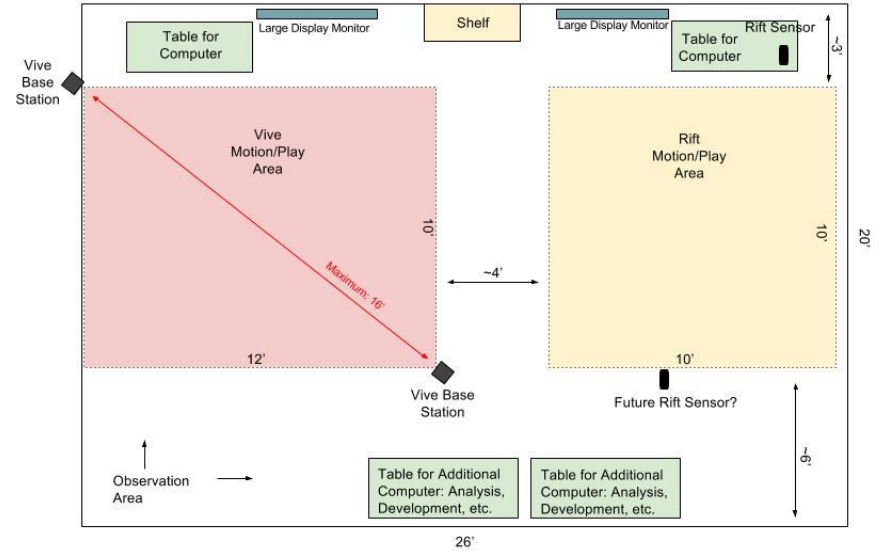


# Space Planning

Area for Vive or Rift



Area for Vive and Rift

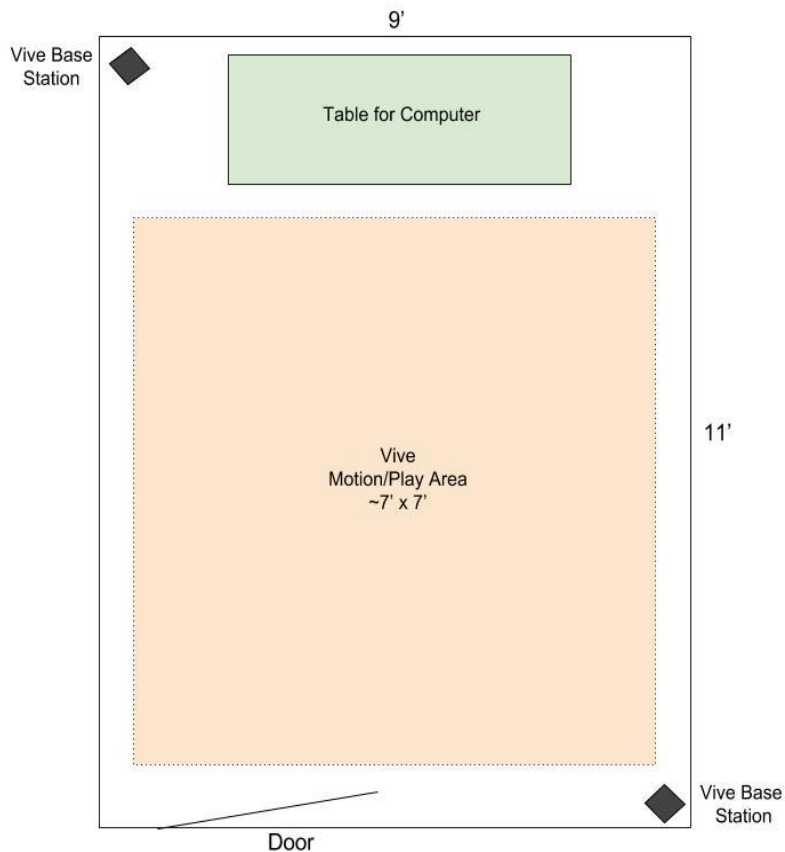




# Space Reality

## VR Usability Lab

- Hunt Library
- 1 workstation
- 1 HTC Vive
- Library Steam account
- Reservable
- 1-2 people



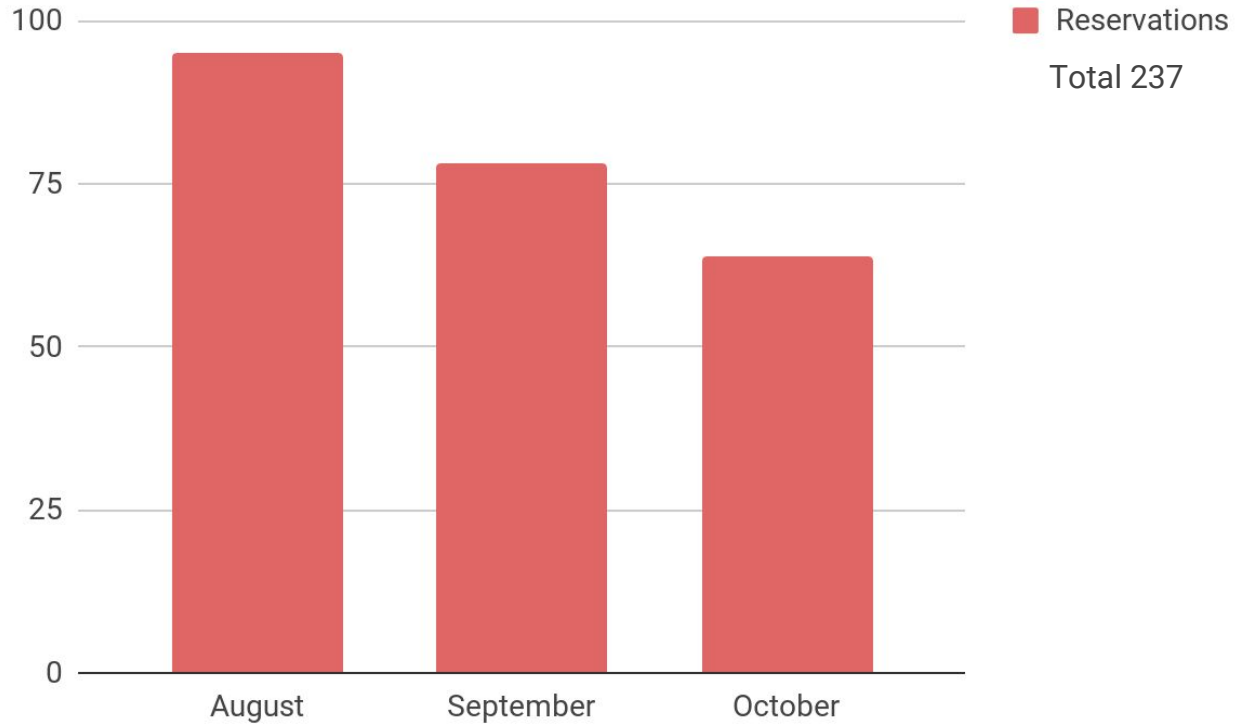
# Space Reality

## VR Usability Lab

- Hunt Library
- 1 workstation
- 1 HTC Vive
- Library Steam account
- Reservable
- 1-2 people



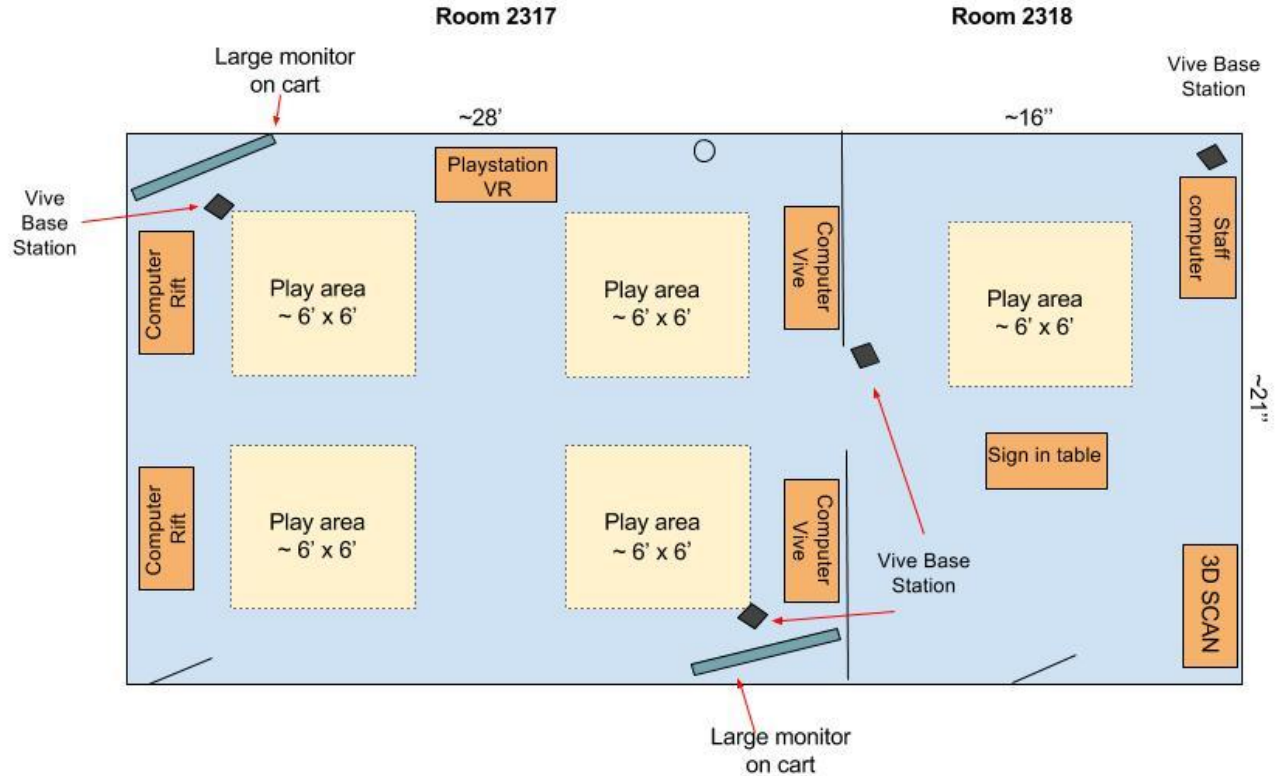
# VR Lab Reservations: Fall 2017



# Space Reality

## VR Studio

Hill Library  
6 workstations  
3 HTC Vives  
3 Oculus Rifts  
1 Playstation VR  
Library Steam accounts  
Library Oculus accounts  
Reservable through email  
1-20 people



# VR Studio

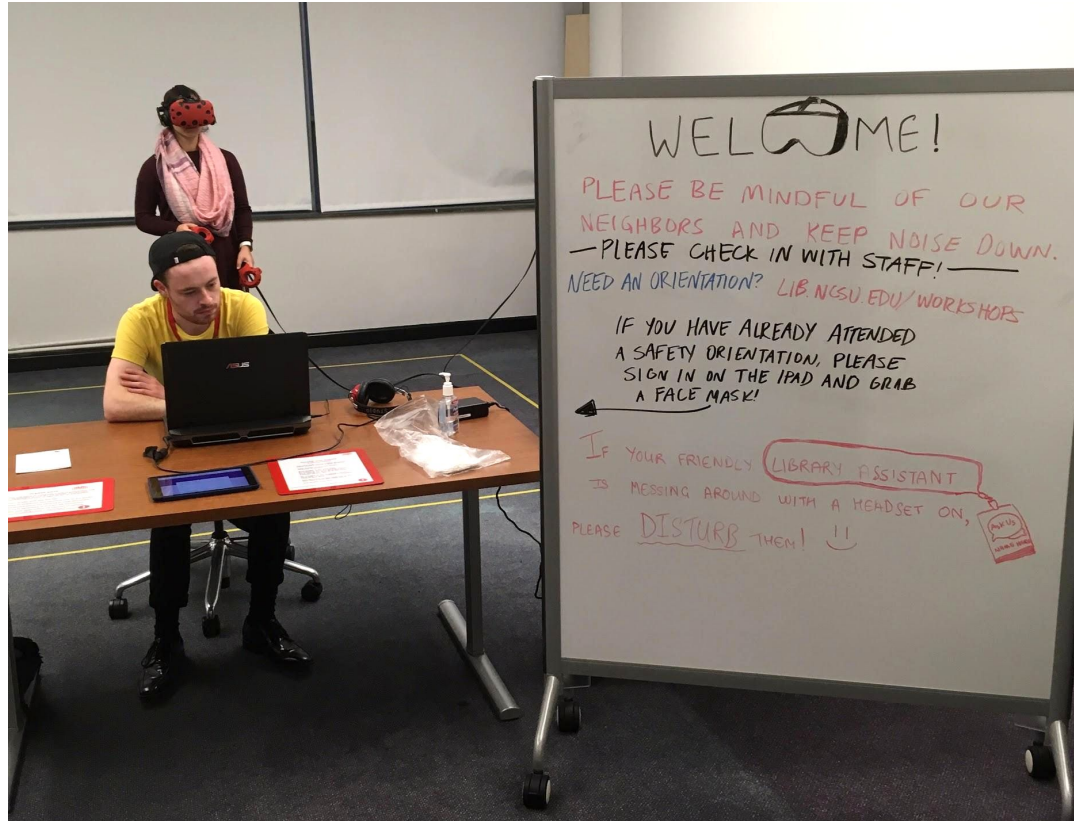


Summer 2017



Fall 2017

# VR Studio





# VR Studio: Rift



# VR Studio: Vive



# Vive Sensors - Mounting



Wall



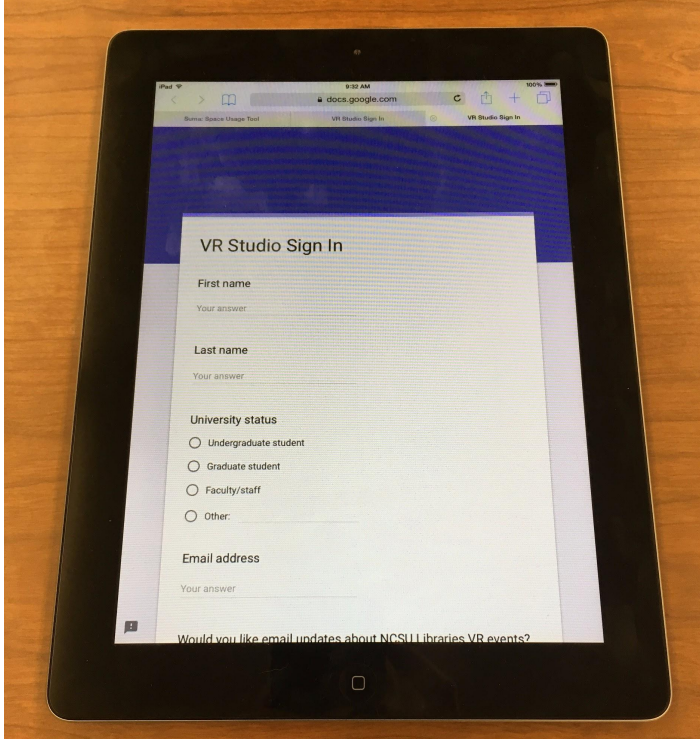
Ceiling



Stand + Adaptor



# Data: Sign In Form / Stats



The tablet screen shows a Google Forms interface for a sign-in page. The title is "VR Studio Sign In". Below the title, there are three input fields: "First name", "Last name", and "Email address". Each field has a "Your answer" label below it. Under the "Email address" field, there is a question: "Would you like email updates about NCSU Libraries VR events?". The background of the form is a blue and white pattern.

VR Studio Sign In

First name  
Your answer

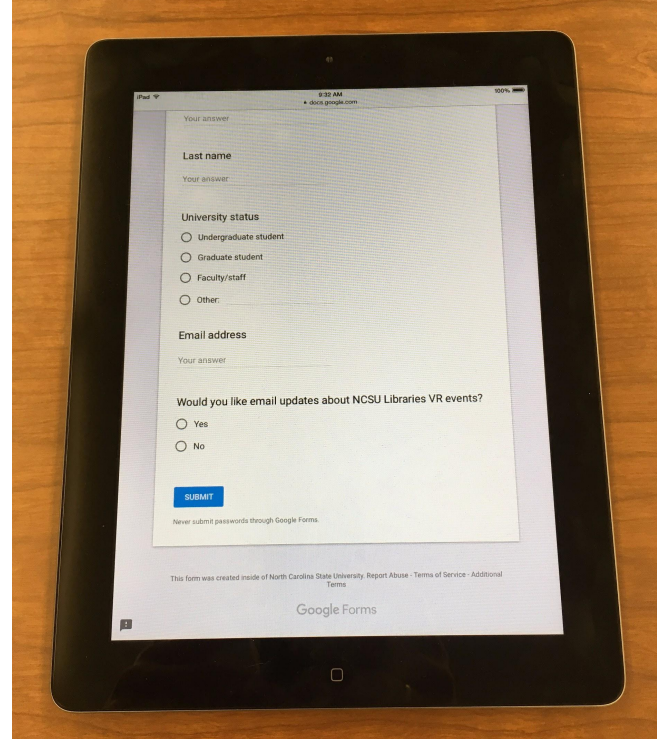
Last name  
Your answer

University status

- ☐ Undergraduate student
- ☐ Graduate student
- ☐ Faculty/staff
- ☐ Other:

Email address  
Your answer

Would you like email updates about NCSU Libraries VR events?



The tablet screen shows a Google Forms interface for a sign-in page. The title is "VR Studio Sign In". Below the title, there are three input fields: "First name", "Last name", and "Email address". Each field has a "Your answer" label below it. Under the "Email address" field, there is a question: "Would you like email updates about NCSU Libraries VR events?". The background of the form is a blue and white pattern.

VR Studio Sign In

First name  
Your answer

Last name  
Your answer

University status

- ☐ Undergraduate student
- ☐ Graduate student
- ☐ Faculty/staff
- ☐ Other:

Email address  
Your answer

Would you like email updates about NCSU Libraries VR events?

☐ Yes

☐ No

**SUBMIT**

Never submit passwords through Google Forms.

This form was created inside of North Carolina State University. Report Abuse - Terms of Service - Additional Terms

Google Forms

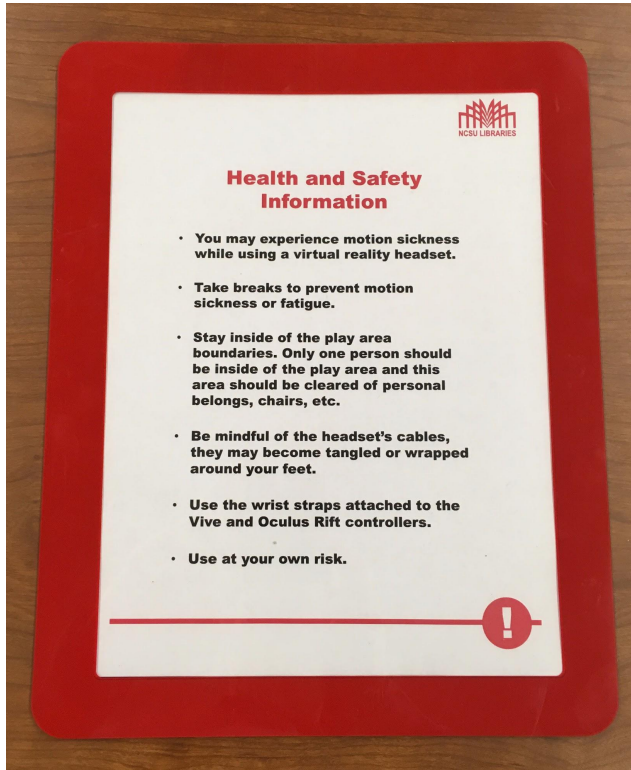
# Safety: Orientation



- Sickness
- Collision
- Tripping
- Dropping

			1 Raiders of the Lost Arcade 7:00 PM to 9:00 PM	2 Alt-Textbook Workshop 1:30 PM to 2:30 PM Modern Homes Reality Architecture Movie Series - Columbus 7:30 PM to 8:45 PM Virtual Reality Studio Orientation 5:00 PM to 5:30 PM	3 Literature searching and Citation Management using Refworks 10:00 AM to 11:30 AM Design Thinking Workshop 2:00 PM to 3:00 PM
5 D.H. Hill Makerspace Orientation 3:00 PM to 4:15 PM Virtual Reality Studio Orientation 5:00 PM to 5:30 PM	6 Lessons learned: Prototyping augmented/virtual reality (AR/VR) at NASA 3:30 PM to 5:00 PM Make Videos at the Library 6:00 PM to 7:30 PM	7 What Makes a Supercomputer so Super? 10:00 AM to 11:00 AM Communicate Your Science: How to Pitch Your Research to the World! 1:30 PM to 3:00 PM D.H. Hill Makerspace Orientation 2:30 PM to 3:15 PM Long Night Against Procrastination 6:00 PM to 11:00 PM Long Night Against Procrastination 6:00 PM to 11:00 PM Student Short Film Showcase - 8th Annual 7:30 PM to 9:00 PM	8 Virtual Reality Studio Orientation 3:30 PM to 4:00 PM Making Space Multiscale Design: From bacteria to buildings with Annelie Koller 4:00 PM to 5:00 PM Intro to Biomaterials for Design Workshop with Annelie Koller 6:00 PM to 9:00 PM Making Space - Intro to Biomaterials for Design Workshop with Annelie Koller 6:00 PM to 9:00 PM State of Sound Sessions 001: Sampling in Ableton Live 6:00 PM to 8:00 PM	9 Global Trekking - Experience the World in Virtual Reality 5:00 PM to 7:30 PM	10 D3 Fundamentals I: Introduction to Web Development 10:00 AM to 12:00 PM No Coding Necessary: Digital Game Design for Everyone! 10:30 AM to 12:00 PM D.H. Hill Makerspace Orientation 12:00 PM to 12:45 PM D3 Fundamentals II: Visualizing Data with D3.js 1:00 PM to 3:00 PM Virtual Reality Studio Orientation 5:00 PM to 5:30 PM
	13 D.H. Hill Makerspace Orientation 3:00 PM to 3:45 PM Video Game Development Club Speaker Series: Q&A with Imangi Studios 7:00 PM to 9:00 PM	14 A LaTeX Primer 2:00 PM to 4:00 PM Undergraduate Research Slams 4:00 PM to 5:00 PM Library Librarians: Special Collections and Spirits 6:00 PM to 8:00 PM Virtual Reality Studio Orientation 6:30 PM to 7:00 PM	15 Introduction to Bioinformatics and NCBI Molecular Searching 1:00 PM to 3:00 PM Undergraduate Research Slams 4:00 PM to 5:00 PM Virtual Reality Studio Orientation 6:30 PM to 7:00 PM	16 Introduction to NCBI BLAST Searching 1:00 PM to 3:00 PM Creative Coding Learnathon: Programming with Loops and Functions 5:30 PM to 8:30 PM Virtual Reality Studio Orientation 6:30 PM to 7:00 PM	17 Coffee & Viz - A Tour of the Solar System 9:30 AM to 10:30 AM Introduction to Google Analytics 12:30 PM to 2:00 PM AVV Geeks at the Hunt Library - How To Survive Thanksgiving

# Safety, Cleanliness

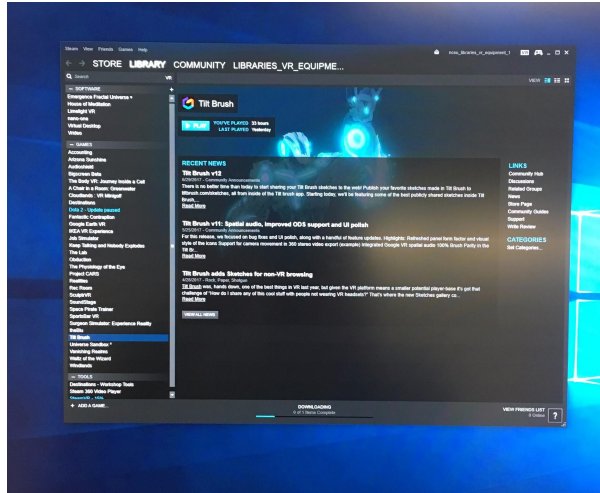




# Safety, Cleanliness

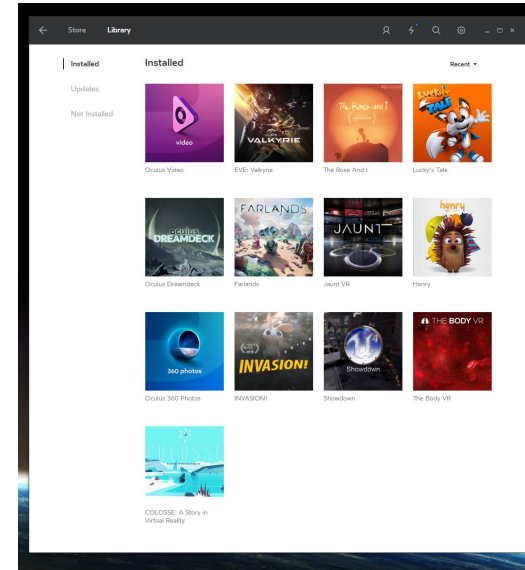


# Accounts & Software/Content



Vive - Steam

<http://store.steampowered.com>



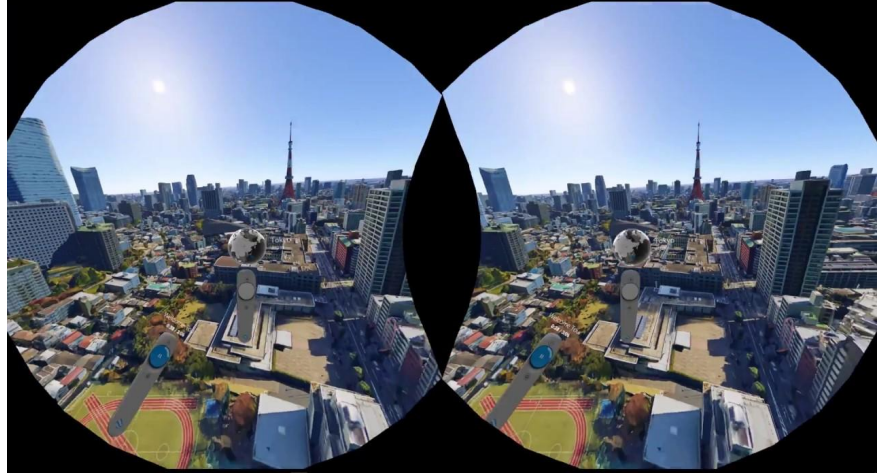
Oculus - Oculus Store

<https://www.oculus.com/experiences/rift/>

# Non-game Introductory VR Apps



Tilt Brush: \$19.99



Google Earth VR: Free

# Social VR



Rec Room



AltspaceVR



vTime

# Producing VR

## Software

Unity

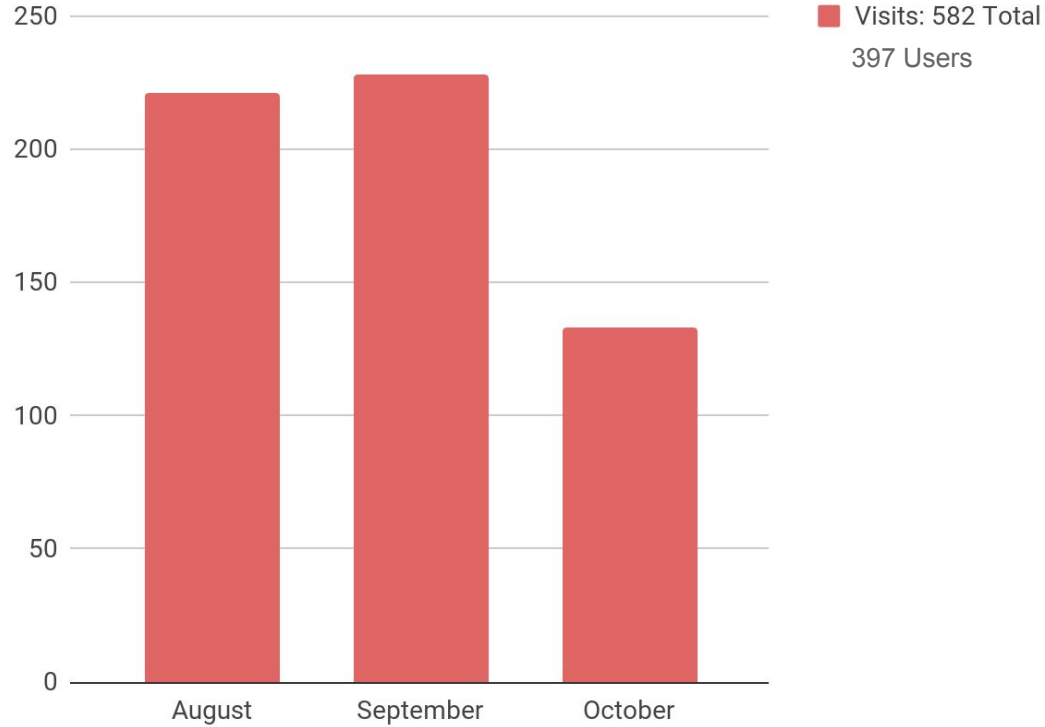


Unreal Engine



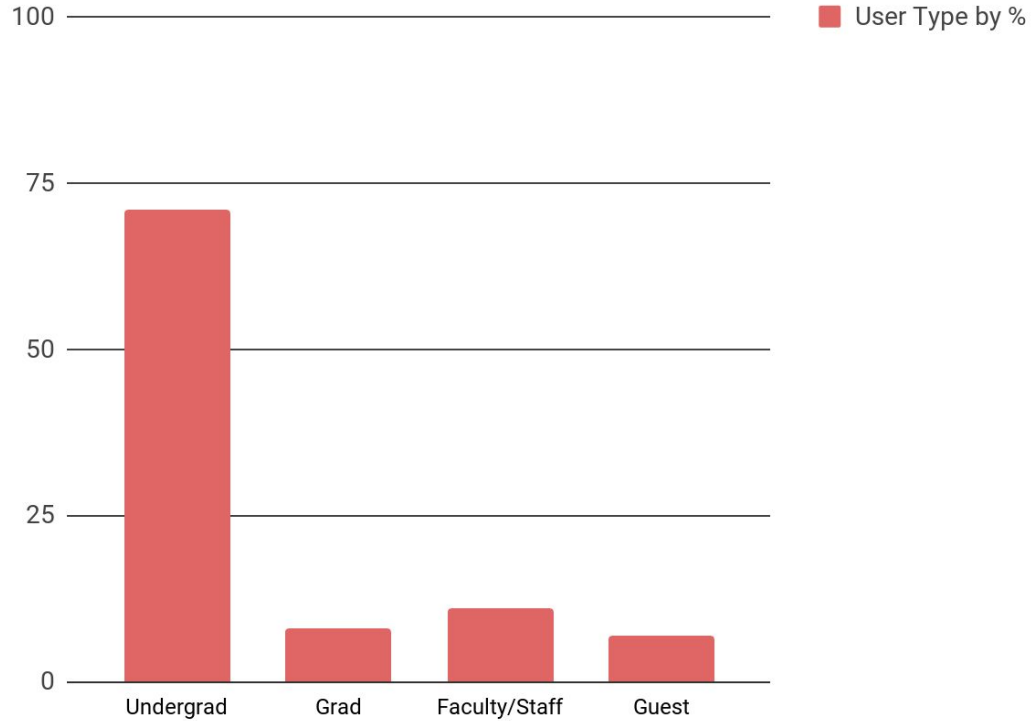
Game Engines, Adobe, Design, Autodesk, 3D modeling, Motion capture...

# VR Studio Use: Fall 2017

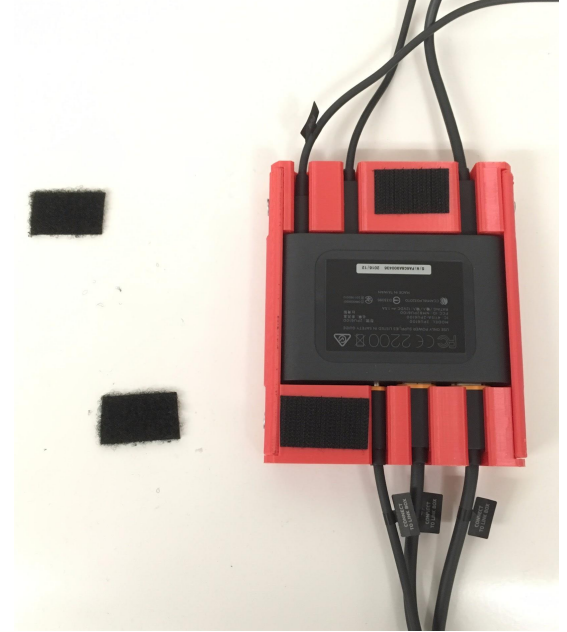




# VR Studio Users: Fall 2017



# Helpful Parts: Link Box Cover



# Helpful Parts: Vive Deluxe Audio Strap



Original



Deluxe Audio Strap

# Virtual Reality @ NC State

- Fire Ecology
- Food Safety
- Digital Humanities
- Architecture
- Computer Science/  
Gaming
- Biodiversity
- Facilities Mgmt



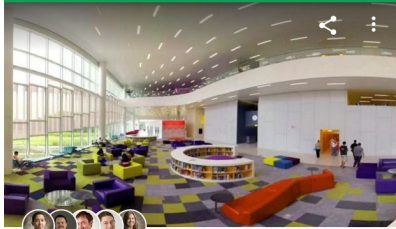
*NC State CNR Fire Ecology*

# Virtual Reality Community

Google+

Communities

Search



58 members - Visible within ncsu.edu

## NC State VR Interest Group

360 Video, Virtual & Augmented Reality Community

MODERATE

Search Community

About Community

Filter

All posts

Discussion


Markus Wust

Events

2d

Just in case you haven't received the announcement through other channels:

Tomorrow is the second event in the Libraries' Coffee & Viz series and the topic is "Virtual Reality: What It Is and What It Can/Can't Do For You." Our presenters are NC State's Mike Cuales and Gary Kapral from Duke. The talk, which starts at 9:30am in the Teaching and Visualization Lab at Hunt Library, is free and open to the public; coffee and bagels will be served starting at 9:15am. There will also be a tech petting zoo from 9:00am to 9:30am and 10:30am to 11:00am in the Creativity Studio next door.



lib.ncsu.edu

David Woodbury

Moderator

Events

2d

Save the date for the next VR Interest Group meeting! We will be meeting October 13 at 3pm in the Multimedia Seminar Center at the D. H. Hill Library.

+1

1

Mike Cuales

Owner


Discussion

2d

A Wild West of VR narrative and storytelling. I had not heard about "Fragments" before - a Hololens CSI game. Very interesting application.

<https://www.ceros.com/blog/vr-storytelling-5-explorers-defining-next-generation-narrative/>

VR Storytelling: 5 Explorers Defining the Next Generation of Narrative - Ceros Blog



ceros.com

www.lib.ncsu.edu/event/coffee-viz-virtual-reality-what-it-and-what-it-cant-d



# VIRTUAL FRIDAY

12:00 p.m. – 5:00 p.m.  
Friday, August 26

Technology Sandbox  
D. H. Hill Library







©1963 Julian Wasser

# EXPERIENCING KING

AT NC STATE UNIVERSITY



# Global Trekking Event



# Staff Support



Mike Nutt



Peter Schreiner



David  
Woodbury



Markus Wust

## Virtual Reality

Virtual reality (VR) headsets for experiences, games, and development.

Cameras and programs for creating and viewing 360° videos.

Virtual reality games and experiences, including:

Dreamdeck, Fantastic Contraption, Farlands, IKEA VR Experience, The Lab, Lucky's Tale, Mythos of the World Axis, Tilt Brush, Waltz of the Wizard, Whirligig. Many more coming soon!

+ Immersive Technology Team

# Additional Resources

General VR News: <https://www.roadtovr.com/>

VR in Education: <https://virtualrealityforeducation.com/>

Immersive Tech for Education: <https://campustechnology.com/newsletters/immerse/archive.aspx>

Social VR: <http://mashable.com/2017/01/12/virtual-reality-social-networks-vr/#.DpaG4NkaOgg>



# Thank You!

Slides at [go.ncsu.edu/accessvr2017](https://go.ncsu.edu/accessvr2017)

**Pete Schreiner**  
**NCSU Libraries Fellow**  
Access Services and  
Learning Spaces & Services  
[\*\*prschrei@ncsu.edu\*\*](mailto:prschrei@ncsu.edu)

